29th International Conference on Automated Planning and Scheduling
Berkeley CA, USA

Learn More at icaps19.icaps-conference.org
The International Conference on Automated Planning and Scheduling (ICAPS) is the premier forum for researchers and practitioners in planning and scheduling - two technologies that are critical to manufacturing, space systems, software engineering, robotics, education, and entertainment. The ICAPS conference resulted from merging two bi-annual conferences, namely the International Conference on Artificial Intelligence Planning and Scheduling (AIPS) and the European Conference on Planning (ECP).

The primary objectives of ICAPS are to further the field of automated planning and scheduling through the organization of technical meetings, including the annual ICAPS conference, through the organization of summer schools, tutorials and training activities at various events, through the organization of planning and scheduling competitions, benchmarking and other means of advancing and assessing the state of the art in the field, by promoting the involvement of young scientists in the field through scholarships and other means, and by promoting and disseminating publications, planning and scheduling systems, domains, simulators, software tools and technical material.

ICAPS 2019 will be held July 11-15 in Berkeley (CA), USA.
Berkeley is a city on the east shore of San Francisco Bay in northern Alameda County, California. Berkeley is home to the oldest campus in the University of California system, the University of California, Berkeley, and the Lawrence Berkeley National Laboratory, which is managed and operated by the University. Berkeley is one of the most politically liberal cities in USA.
## Conference at a Glance

### Wednesday, July 10th

**Room 310**
- **AM**
  - Doctoral Consortium


### Thursday, July 11th

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<td>(T) From Teaching the PDDL Novice to Empowering the Planning Solution Integrator</td>
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<td>254</td>
<td>(W) Hierarchical Planning (continued)</td>
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<td>250</td>
<td>(T) Goal Recognition Design</td>
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<td>630</td>
<td>(T) Planning and Scheduling Approaches for Urban Traffic Control</td>
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### Friday, July 12th

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<td>242</td>
<td>(W) IntEx (continued)</td>
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<td>254</td>
<td>(T) AI Planning for Robotics with ROSPlan (continued)</td>
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<td>(T) Multi-agent Path Finding: Models, Solvers, and Systems</td>
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<td>250</td>
<td>(T) Deep Reinforcement Learning with Applications in Transportation</td>
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<td>(T) Temporal Reasoning</td>
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<td>310</td>
<td>(W) XAIP (continued)</td>
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<td>630</td>
<td>(W) Actions (continued)</td>
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### Saturday, July 13th

**Invited talk: Anca Dragan**
- Classical Planning
  - Planetary Exploration
  - Coffee Break
- Probabilistic Planning I
  - LTL & Temporal Planning
  - Lunch
  - Reinforcement Learning
  - Coffee Break
- Invited Industry Session
  - Hybrid Planning & Algorithm Selection Complexity

**Poster & Demo Session**

### Sunday, July 14th

**Invited talk: J. Christopher Beck**
- Multi-Agent Planning
  - Knowledge Engineering and Execution
  - Coffee Break
- Optimal & Oversubscription Planning
  - Scheduling under Uncertainty
  - Lunch
- Recognition, Goal and Model Reasoning
  - Applications I
  - Coffee Break
- Recognition II
- Robotics I
  - Awards + Community meeting (ends at 18:30)
  - Banquet

### Monday, July 15th

**Invited talk: Derek Long**
- Probabilistic Planning II
  - Applications II
  - Coffee Break
- Learning
  - Constraint Reasoning and OR
  - Lunch
- Path and Motion Planning
  - Robotics II
  - Coffee Break
- Path Planning
  - Transportation Scheduling
  - Hybrid Planning
- Applications III

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**ICAPS 2019 in Berkeley CA, USA**
Workshops and Tutorials

Workshops

Reasoning about Actions and Processes: Highlights of Recent Advances (Actions)
Jorge Baier, Sheila McIlraith, Sebastian Sardina 630

Hierarchical Planning
Pascal Bercher, Gregor Behnke, Vikas Shivashankar, Ron Alford 254

Heuristics and Search for Domain-independent Planning (HSDIP)
Patrik Haslum, Daniel Gnad, Miquel Ramirez, Florian Pommerening, Jendrik Seipp, Florian Geisser, Guillem Francès, Silvan Sievers 242

Integrating Planning, Acting, and Execution (IntEx)
Mak Roberts, Tiago Vaquero, Tim Niemueller, Simone Fratini 242

The International Planning Competition (WIPC)
Alvaro Torralba, Florian Pommerening, Thomas Keller, Amanda Coles, Andrew Coles 240

Knowledge Engineering for Planning and Scheduling (KEPS)
Mauro Vallati, Lukas Chrpa, Ron Petrick, Tiago Vaquero, Christian Muise, Tathagata Chakraborti 240

Planning and Robotics (PlanRob)
Michael Cashmore, Alberto Finzi, AndreA Orlandini 310

The Scheduling and Planning Applications woRKshop (SPARK)
Sara Bernardini, Simon Parkinson, Kartik Talamadupula, Neil Yorke-Smith 630

Explainable Planning (XAIP)
Tathagata Chakraborti, Dustin Dannenhauer, Joerg Hoffmann, Daniele Magazzeni 310

Tutorials

Multi-Agent Pathfinding: Models, Solvers, and Systems
Roman Barták, Philipp Obermeier, Torsten Schaub, Tran Cao Son, Roni Stern 254

Planning and Scheduling Approaches for Urban Traffic Control
Scott Sanner, Stephen F. Smith, Mauro Vallati 630

Temporal Reasoning
Nikhil Bhargava, Brian Williams 250

AI Planning for Robotics with ROSPlan
Michael Cashmore, Daniele Magazzeni 254

From Teaching the PDDL Novice to Empowering the Planning Solution Integrator
Jan Dolejsi, Derek Long, Maria Fox, Christian Muise 240

Integrated Task and Motion Planning
Malik Ghallab, Felix Ingrand, Rachid Alami, Thierry Simeon 250

Goal Recognition Design
Sarah Keren, William Yeoh 250

Deep Reinforcement Learning with Applications in Transportation
Zhiwei (Tony) Qin, Jian Tang, Jieping Ye 250

All the room numbers for the Doctoral Consortium, Workshops and Tutorials are in Sutardja Dai Hall
10:40-11:00 am

**Coffee Break**

11:00-12:30 pm

**Optimal & Oversubscription Planning**

- **Scheduling under Uncertainty**
  - Tabu-Based Large Neighborhood Search for Time/Sequence-Dependent Scheduling Problems with Time Windows: Lai He, Mathijss de Weerdt and Neil Yorke-Smith
  - Quantifying Degrees of Controllability in Temporal Networks with Uncertainty: Shayan Akmal, Savana Ammons, Maggie Li and Jim Boeckel - Honorable Mention - Best Student Paper Award
  - Measuring and Optimizing Durability Against Scheduling Disturbances: Joon Lee, Vvassab Oja and Jim Boeckel - Short Paper
  - Reducing the Computational and Communication Overhead of Robust Agent Rescheduling: Jordan Abrahams, William Loyal, Grace Diehl, Marina Knittel, Judy Lin, David Chu, Jeremy Frank and Jim Boeckel

- **Recognition, Goal and Model Reasoning**

- **Applications I**
  - Recognition using a Particle Filter: Röger, Malte Helmert, Hadrien Cambazard, Louis-Honorable Mention - Best Dissertation Award
  - Foundations of Human-Aware Planning – A Landscape of Interpretable Robot Behavior: Augusto B. Corrêa and Florian Pommerening - Short Paper
  - Camera Networks for Efficient Target Tracking: Flexas, Brian Claus, Andrew F. Thompson, Yanwu Zhang, Evan B. Clark, Steve Chen, David M. Fratanton, James C. Kinsey, Brett Hobson, Brian

- **Recognition II**
  - Finding Centroids and Minimum Covering States in Planning: Alberto Pazanco, Yolanda E. Martin, Susana Fernández and Daniel Borrojo - Short Paper

- **Robotics I**
  - Landmark-Enhanced Heuristics for Goal Recognition in Incomplete Domain Models: Ramon Fraga Pereira, Andre Grah Pereira and Felipe Meneguzzi
  - Error-Tolerant Anytime Approach for Plan Recognition using a Particle Filter: Jean Massardi, Mathieu Gravel and Eric Beauzuy

- **Robotics II**
  - POMDP-based Candy Server: Lessons Learned from a Seven Day Demo: Arthur Clavere, Sourdeep Dutta and Sriman Sankaranarayanan
  - Trajectory Tracking Control for Robotic Vehicles using Counterexample-Guided Training of Neural Networks: Marcus Hoeger, Joshua Mun Liang, Song, Hanna Kuusimaa and Alberto Efte

- **Applications II**
  - Online Risk-Bounded Motion Planning for Autonomous Vehicles in Dynamic Environments: Xin Huang, Sang IEEE 14.5, Andreas Hoffmann and Bilian Williams

7:00-9:00 pm

**Invited talk: Derek Long**

12:30:20 pm

**Lunch**

2:00-3:30 pm

**Path and Motion Planning**

- Implicit Coordination Multi-Agent Path Finding under Destination Uncertainty: Success Guarantees and Computational Complexity: Bernhard Nebel, Thomas Bolander, Thorsten Engesser and Robert Mattmüller - Journal Paper
  - Lazy CBS: Implicit Conflict-Based Search Using Lazy Clause Generation: Wui Che, Jagriti Electrical Engineering and Steve Chen

- **Robotics II**
  - Open-world Reasoning for Service Robots: Kyle E. C. Booth and J. Christopher Hong

3:30-3:50 pm

**Coffee Break**

3:50-4:30 pm

**Recognition II**

- Landmark-Enhanced Heuristics for Goal Recognition in Incomplete Domain Models: Ramon Fraga Pereira, Andre Grah Pereira and Felipe Meneguzzi

- **Robotics I**
  - Error-Tolerant Anytime Approach for Plan Recognition using a Particle Filter: Jean Massardi, Mathieu Gravel and Eric Beauzuy

- **Robotics II**
  - POMDP-based Candy Server: Lessons Learned from a Seven Day Demo: Arthur Clavere, Sourdeep Dutta and Sriman Sankaranarayanan

4:40-6:30 pm

**Awards Session & Community Meeting**

10:40-11:00 am

**Coffee Break**

11:00-12:30 pm

**Learning**

- Towards Stable Symbol Grounding with Zero-Suppressed State AutoEncoder: Masatomo Asai and Hiroshi Kajino

- Unsupervised Grounding of Plannable First-Order Logic Representation from Images: Masatomo Asai

- Fast Feature Selection for Linear Value Function Approximation: Bahram Behzadian, Soheil Chaharpanah and Marek Petrik

- Maximum Entropy based Independent Learning in Anonymous Multi-Agent Environments: Tarek Verma, Pradeep Varakantham and Hoong Chiong Loo

**Path and Motion Planning**

- Improving the Combination of JPS and Geometric Approximation: Bahram Behzadian, Soheil Chaharpanah and Marek Petrik

- Learning Heuristic for Mobile Robot Path Planning: Using Deep Neural Network: Xin Huang, Sang IEEE 14.5, Andreas Hoffmann and Bilian Williams

- Generalized Lazy Search for Robot Motion Planning: Interleaving Search and Edge Evaluations via Event-based Toggling: Aditya Mandale, Sanjayan Choudhury, Oren Salzman and Siddhartha Srinivasa - Best Student Paper Award

5:00-6:00 pm

**Awards Session & Community Meeting**

7:00-9:00 pm

**Banquet**

8:30-9:30 am

**Probabilistic Planning II**

- Online Risk-Bounded Motion Planning for Autonomous Vehicles in Dynamic Environments: Xin Huang, Sang IEEE 14.5, Andreas Hoffmann and Bilian Williams

- A theoretical and algorithmic analysis of configurable MDPs: Rui Sikela, Gabriele Farina, Francisco S. Melo and Manuela Veloso

- Stochastic Planning with Lifted Symbolic Trajectory Optimization: Thomas Keller and Rani Khardon

9:40-10:40 am

**Learning**

- Constraint Reasoning and OR

  - Learning Scheduling Models from Event Data: Ank S. Soodenvich, Kyle E. C. Booth and J. Christopher Hong

  - Efficiently Exploring Ordering Problems through Conflict-directed Search: Jingkai Chen, Cheng Fang, David Wang, Andrew Wang and Brian Williams


- A stochastic dual dynamic integer programming for the uncompensated lot sizing problem with uncertain demand and costs: Franco Quesada, Catherine C. Chevalier and Safia Radidedi

**Path and Motion Planning**

- Implicit Coordination Multi-Agent Path Finding under Destination Uncertainty: Success Guarantees and Computational Complexity: Bernhard Nebel, Thomas Bolander, Thorsten Engesser and Robert Mattmüller - Journal Paper

- Lazy CBS: Implicit Conflict-Based Search Using Lazy Clause Generation: Wui Che, Jagriti Electrical Engineering and Steve Chen

**Robotics II**

- Open-world Reasoning for Service Robots: Yuzin Jiang, Nick Walker, Justin Hart and Peter Stone


- Provably Infinite-Horizon Real-Time Planning for Repetitive Tasks: Fahad Mirza, Oren Salzman and Maxim Lucikhe

- Speeding Up Search-based Motion Planning via Conservative Heuristics: Ishan Chatterjee, Maxim Lucikhe, Ashvin Khadke and Manuela Veloso - Short Paper

- An Hierarchical Approach to Active Semantic Mapping Using Probabilistic Logic and Information Reward POMDP: Tiago Veiga, Miguel Silva, Rodrigo Ventura and Pedro U. Lima

**Applications II**

- Towards Automating Crime Prevention through Environmental Design (CPTED) Analysis to Predict Burglary: Leanne Monchuk, Steve Chien, James Kirkman and Peter J. Stuckey

- The Clustered Dial-a-Ride Problem: Fabian Fetsch and Sabine Storandt

Cutting the Size of Compressed Path Databases With Wildcards and Redundant Symbols
Mattia Chiari, Shizhe Zhao, Adi Botea, Alfonso Gerevini, Daniel Harabor, Alessandro Saetti, Matteo Salvetti and Peter J. Stuckey

Disjoint Splitting for Conflict-Based Search for Multi-Agent Path Finding
Jiaoyang Li, Daniel Harabor, Peter Stuckey, Ariel Felner, Hang Ma and Sven Koenig - Short Paper

A Multi-Label A* Algorithm for Multi-Agent Pathfinding
Florian Grenouilleau, Willem-Jan van Hoeve and J. H. Hooker - Short Paper

Transportation Scheduling
Approximate Gradient Descent Convergence Dynamics for Adaptive Control on Heterogeneous Networks
Jean Carpentier and Sebastian Blandin

Using Bi-Directional Information Exchange to Improve Decentralized Schedule-Driven Traffic Control
Hsu-Chieh Hu and Stephen Smith

A Multi-Label A* Algorithm for Multi-Agent Path Finding
Florian Grenouilleau, Willem-Jan van Hoeve and J. H. Hooker - Short Paper

Applications III
Exact Methods for Extended Rotating Workforce Scheduling Problems
Lucas Kiezandner, Nysret Musliu, Johannes Gartner, Werner Schaffhauser and Thomas Krennwallner

Solution Approaches for an Automotive Paint Shop Scheduling Problem
Felix Winter, Emir Demirovic, Nysret Musliu and Christoph Mlckikia

Personalized Medication and Activity Planning in PDDL+
Fares K. Alaboud and Andrew Coles

Hybrid Planning & Algorithm Selection
A Logical Semantics for PDDL+
Vitaliy Batusov and Mikhail Soutchanski

Mixed Discrete Continuous Non-Linear Planning Through Piecewise Linear Approximation
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Cyber-Physical Planning: Deliberation for Hybrid Systems with a Continuous Numeric State
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ICAPS 2019 would not be possible without the support of our Sponsors.

Up Coming Events

Don’t miss out!

ICAPS 2020 in Nancy, France
June 15 - 16

The International Conference on Automated Planning and Scheduling (ICAPS) is the premier forum for exchanging news and research results on theory and applications of intelligent planning and scheduling technology. ICAPS 2020 will be held in Nancy, France.